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10/511,077	04/26/2005	Roberto Mariani	2085-02800	6490
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CONLEY ROSE, P.C. David A. Rose P. O. BOX 3267 HOUSTON, TX 77253-3267			EXAMINER LE, BRIAN Q	
			ART UNIT 2624	PAPER NUMBER
			NOTIFICATION DATE 12/31/2009	DELIVERY MODE ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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### Office Action Summary

**Application No.**

10/511,077

**Applicant(s)**

MARIANI, ROBERTO

**Examiner**

BRIAN Q. LE

**Art Unit**

2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 October 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 and 3-37 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 3-37 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/22)
- Paper No(s)/Mail Date \_\_\_\_\_

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/22/2009 has been entered.

***Response to Arguments***

1. Applicant's arguments filed 10/22/2009 have been fully considered but they are not persuasive.

Regarding claim 1, the Applicant argues (page 10 of the Remarks) that Yan reference does not teach a concept of finding probability of errors. The Examiner would like to remind the Applicant that since the claim still indicates "an/or" language, the Examiner does not necessary need to find the teaching of modeling errors if the reference already disclosed various light conditions or facial expression or varying facial orientations...etc. Also, since the claim never defined what "finding probability of error" is, this allows the Examiner to make broad reasonable interpretation which is a concept of solving minimization problem as disclosed by Yan (column 9, lines 25-35).

Also the Applicant argues (page 12 of the Remarks) that that Fig. 9 of Yan has nothing whatsoever to do with any possible eye position errors. However, Applicant's arguments are directed toward a specific portion of Yan cited by the Examiner. The Examiner would like to points out that the rejections were based upon the entire reference. Therefore, Applicant is urged to consider the reference as a whole. When considering the cited portions within context the

whole patent, it is seen that the claimed invention is shown by Yan. In this case, as discussed above, Yan teaches a concept of solving minimization problem. Thus, FIG. 9 shows alternative facial position of each eye to create plurality of face prototypes so that by using a solution of minimization problem (column 9, lines 25-35) would be able to compensate for possible eye position errors.

Additionally, the Applicant argues (page 13 of the Remarks) that Tian does not disclose error modeling (i.e. possible expression, varying facial orientations ...etc). The Examiner respectfully disagrees. Tian clearly teaches a concept of a facial expression analysis which includes variance in position, scale, and lighting changes (column 1, line 61 - column 2, line 24) and therefore teaches error modeling.

To further assist the Applicant with the guidance with claim language interpretations so that the Applicant can add further/more details limitations from the specification to the claims to overcome the prior arts, the Examiner is presenting MPEP, section 2111, Claim Interpretation; Broadest Reasonable Interpretation as follow: "The court explained that "reading a claim in light of the specification, to thereby interpret limitations explicitly recited in the claim, is a quite different thing from reading limitations of the specification into a claim," to thereby narrow the scope of the claim by implicitly adding disclosed limitations which have no express basis in the claim." The court found that applicant was advocating the latter, i.e., the impermissible importation of subject matter from the specification into the claim.). See also *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027-28 (Fed. Cir. 1997) (The court held that the PTO is not required, in the course of prosecution, to interpret claims in applications in the same manner as a court would interpret claims in an infringement suit. Rather, the "PTO applies to

verbiage of the proposed claims the broadest reasonable meaning of the words in their ordinary usage as they would be understood by one of ordinary skill in the art, taking into account whatever enlightenment by way of definitions or otherwise that may be afforded by the written description contained in applicant's specification.”).

For all other arguments, the Applicant is advised to refer back to all the explanations addressed above since other arguments are depending on the basis of arguments discussed above.

***Claim Rejections - 35 USC § 101***

1. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2. Claim(s) 1, 3-37 are rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. The Federal Circuit<sup>1</sup>, relying upon Supreme Court precedent<sup>2</sup>, has indicated that a statutory “process” under 35 U.S.C. 101 must (1) be tied to a particular machine or apparatus, or (2) transform a particular article to a different state or thing. This is referred to as the “machine or transformation test”, whereby the recitation of a particular machine or transformation of an article must impose meaningful limits on the claim's scope to impart patent-eligibility (See *Benson*, 409 U.S. at 71-72), and the involvement of the machine or transformation in the claimed process must not merely be insignificant extra-solution activity (See *Flook*, 437 U.S. at 590”). While the instant claim(s) recite a series of steps or acts to be performed, the claim(s) neither transform an article nor are positively tied to a particular machine

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<sup>1</sup> *In re Bilski*, 88 USPQ2d 1385 (Fed. Cir. 2008).

<sup>2</sup> *Diamond v. Diehr*, 450 U.S. 175, 184 (1981); *Parker v. Flook*, 437 U.S. 584, 588 n.9 (1978); *Gottschalk v. Benson*, 409 U.S. 63, 70 (1972); *Cochrane v. Deener*, 94 U.S. 780, 787-88 (1876).

that accomplishes the claimed method steps, and therefore do not qualify as a statutory process. That is, regarding independent claims 1, 20 and 37, the claim's limitations do not tie to a particular machine and also do not involve in a "physical or chemical transformation" or a "qualifying data transformation" since the claims' steps do not represent a physical/real object or depict the modified data as an external representation of the physical object or substance, such as but not limited to a visual display. The examiner suggest amending the claims to tie to a particular machine such as "computer" or "image processor (or similar in scope) to the "meaningful and significant steps/limitations" of the bodies of the claims (not in the preambles of the claims). Any amendment to the claims should be commensurate with its corresponding disclosure.

Other claims are rejected because they are dependent on the independent claims.

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1, and 3-36 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Regarding independent claims 1, and 20, no where in the specification was found to show the support for the concept "synthesizing the image of said actual face includes determining alternative facial positions for each eye to create the plurality of face prototypes so as to compensate for possible

eye position errors". The Applicant is required to show the exact support (page number and line number) for the amended limitation above.

Other claims are rejected because they are dependent on the independent claims.

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 3-9, 11, 14, 15, 17, 20-25, 27, 30, 31, 33, 36, and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,975,750 by Yan et al. ("Yan") in view of U.S. Patent 6,879,709 by Tian et al. ("Tian").

Regarding claim 1, Yan discloses a face recognition and/or verification method comprising the step of

registering a persons actual face wherein an image of said actual face is captured and synthesized to create a plurality of face prototypes (212, figure 2), said face prototypes representing possible appearances of said actual face under lighting conditions (column 8, lines 36-40), varying facial orientations (column 7, lines 5-8), and/or modeling errors (minimization problem) (column 9, lines 25-35),

wherein said face prototypes are stored for later analysis and comparison with a captured image to be recognised or verified (214, figure 2).

Yan discloses synthesizing of said actual face includes determining alternative positions for each eye so as to compensate for possible errors (see figure 9: synthesizing includes determining alternative poses of the face having different eye positions to compensate for potential matching errors when recognizing a face captured at an arbitrary pose).

Yan teaches that the captured actual images are preferably "frontal" images of a person's face (column 1/54-60) but does not appear to disclose that the captured faces are normalized via at least one of translational, rotational and scalar transformations, as claimed.

Tian discloses a face processing system that deals with various facial expression (FIG. 3B and FIG. 11, element 1170). In particular, Tian teaches that it is conventional to "normalize" faces as a preprocessing step in a facial recognition system (column 1/63—2/24). That is, images of different faces typically exhibit a great deal of variance in position, scale, and lighting, and it may be necessary to normalize the faces to compensate for such variations of position, pose, scale, and illumination.

Accordingly, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Yan by Tian to achieve the claimed invention by normalizing the captured facial images, as claimed, since Yan teaches a preference for frontal images, and Tian recognizes that in many circumstances it is necessary to normalize inputted facial images in order to transform the faces into a desired position, pose, or scale—i.e., produce a standardized frontal view according to Yan's preference.

Regarding claim 3, Yan discloses comparison of said face prototypes and captured image uses a face matching algorithm (column 12/12-33).



Regarding claim 4, Yan discloses comparison of said face prototypes and captured image uses face templates or feature vectors (column 12/12-33: feature vectors used as input to neural network facial recognizer—see figure 4 of U.S. Pat. 6,944,319, which Yan incorporates by reference).

Regarding claim 5, the combination of Yan and Tian teaches synthesizing of said actual face includes normalising said actual face image based on the spatial relationship between at least two features of the actual face image (see Tian, column 2/8-24: pose is adjusted based on relationship among eyes, nose, and mouth).

Regarding claim 6, the combination of Yan and Tian teaches normalising includes rotating said actual face image to bring eyes of said actual face image to a horizontal plane (column 12/12-33: face is rotated to a frontal view, thereby bringing eyes to a horizontal plane).

Regarding claim 7, the combination of Yan and Tian teaches normalising includes scaling said actual face image such that the eyes are a fixed distance apart (column 1/63—2/19: the segment between the eyes is identified and the face is scaled to a desired scale, thereby bringing the face to a standardized frontal view with the eyes a fixed distance apart).

Regarding claim 8, the combination of Yan and Tian teaches normalizing the facial image to a desired scale but does not expressly disclose that the eyes are fixed at 50 pixels apart. However, such a limitation is not considered to patentably distinguish from the combination of Yan and Tian since it appears to represent merely an arbitrary facet of the invention. Those skilled in the art would have been aware of the relative pros and cons of utilizing any specific size of facial images to process and would have taken those factors into consideration as design choices dependant upon the particulars of the operating environment.

Regarding claim 9, Yan discloses the area above the person's eyebrows and below the person's mouth is not synthesized (see e.g., figure 6: the area above the eyes (the hair) and the area below the mouth (the neck) are not synthesized).

Regarding claim 11, Yan discloses five alternative positions are determined for each eye (see figure 9: more than 5 positions are determined).

Regarding claim 14, Yan discloses synthesizing of said actual face includes applying at least one predefined warping mark to said actual face image (see e.g., figure 6—textured mesh used for warping is applied to the face).

Regarding claim 15, Yan discloses 25 predefined warping marks are used (see figure 6: more than 25 mesh triangles are used).

Regarding claim 17, Yan discloses said at least one warping mask includes geometric transform (column 9/1-36: the vertices of the mesh triangles are geometrically transformed to warp the face).

Regarding claim 20, Yan discloses a facial prototype synthesis system wherein an image of a persons actual face is used for creating a plurality of face prototypes, said face prototypes representing possible appearances of said actual face under various lighting conditions, varying facial expressions, varying facial orientations, and/or modeling errors, and wherein said face prototypes are stored for later use (see e.g., figures 1 and 2).

Yan teaches that the captured actual images are preferably "frontal" images of a person's face (column 1/54-60) but does not appear to disclose that the captured faces are normalized via at least one of translational, rotational and scalar transformations, as claimed.

Tian discloses a face processing system. In particular, Tian teaches that it is conventional to "normalize" faces as a preprocessing step in a facial recognition system (column 1/63—2/24). That is, images of different faces typically exhibit a great deal of variance in position, scale, and lighting, and it may be necessary to normalize the faces to compensate for such variations of position, pose, scale, and illumination.

Accordingly, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Yan by Tian to achieve the claimed invention by normalizing the captured facial images, as claimed, since Yan teaches a preference for frontal images, and Tian recognizes that in many circumstances it is necessary to normalize inputted facial images in order to transform the faces into a desired position, pose, or scale—i.e., produce a standardized frontal view according to Yan's preference.

Regarding claim 21, the combination of Yan and Tian teaches that said actual face image is normalized prior to creating said face prototypes based on the spatial relationship between at least two features of the actual face image (see Tian, column 2/8-24: pose is adjusted based on relationship among eyes, nose, and mouth).

Regarding claim 22, Yan discloses normalising includes rotating said actual face image to bring eyes of said actual face image to a horizontal plane (column 12/12-33: face is rotated to a frontal view, thereby bringing eyes to a horizontal plane).

Regarding claim 23, Yan discloses normalising includes scaling said actual face image such that the eyes are a fixed distance apart (column 1/63—2/19: the segment between the eyes is identified and the face is scaled to a desired scale, thereby bringing the face to a standardized frontal view with the eyes a fixed distance apart).

Regarding claim 24, the combination of Yan and Tian teaches normalizing the facial image to a desired scale but does not expressly disclose that the eyes are fixed at 50 pixels apart. However, such a limitation is not considered to patentably distinguish from the combination of Yan and Tian since it appears to represent merely an arbitrary facet of the invention. Those skilled in the art would have been aware of the relative pros and cons of utilizing any specific size of facial images to process and would have taken those factors into consideration as design choices dependant upon the particulars of the operating environment. .

Regarding claim 25, Yan discloses the area above the persons eyebrows and below the persons mouth is not synthesized (see e.g., figure 6: the area above the eyes (the hair) and the area below the mouth (the neck) are not synthesized).

Regarding claim 27, Yan discloses five alternative positions are determined for each eye (see figure 9: more than 5 positions are determined).

Regarding claim 30, Yan discloses to create said face prototypes said system applies at least one predefined warping mask to said actual face image (see e.g., figure 6—textured mesh used for warping is applied to the face).

Regarding claim 31, Yan discloses 25 predefined warping masks are used (see figure 6: more than 25 mesh triangles are used).

Regarding claim 33, Yan discloses said at least one warping mask includes geometric transform (column 9/1-36: the vertices of the mesh triangles are geometrically transformed to warp the face).

Regarding claim 36, Yan discloses said face prototypes are generated by applying photometric and/or geometric transforms to said image (column 9/1-36: the vertices of the mesh

triangles are geometrically transformed to warp the face; column 12/7-11: photometric transform is applied).

Regarding claim 37, Yan discloses a facial prototype synthesis system wherein an image of a persons actual face is synthesized by determining possible alternative eye positions and applying at least one mask to said image to create a plurality of face prototypes, and wherein said face prototypes represent possible appearances of said actual face under various lighting conditions, varying facial expressions, varying facial orientations, and/or modeling errors (see e.g., figures 1 and 2).

Yan teaches that the captured actual images are preferably "frontal" images of a person's face (column 1/54-60) but does not appear to disclose that the captured faces are normalized via at least one of translational, rotational and scalar transformations, as claimed.

Tian discloses a face processing system. In particular, Tian teaches that it is conventional to "normalize" faces as a preprocessing step in a facial recognition system (column 1/63—2/24). That is, images of different faces typically exhibit a great deal of variance in position, scale, and lighting, and it may be necessary to normalize the faces to compensate for such variations of position, pose, scale, and illumination.

Accordingly, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Yan by Tian to achieve the claimed invention by normalizing the captured facial images, as claimed, since Yan teaches a preference for frontal images, and Tian recognizes that in many circumstances it is necessary to normalize inputted facial images in

order to transform the faces into a desired position, pose, or scale—i.e., produce a standardized frontal view according to Yan's preference.

3. Claims 12, 13, 19, 28, 29, 32, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,975,750 by Yan et al. ("Yan") in view of U.S. Patent 6,879,709 by Tian et al. ("Tian") as applied to claims 1 and 20 above, and further in view of U.S. Patent 7,221,809 by Geng ("Geng").

Regarding claims 12 and 28, Yan teaches that synthesizing of said actual face includes adjusting the illumination thereof (column 12/7-11). However, Yan does not appear to expressly disclose vary the illumination by applying at least one predefined lighting mask to said actual face image.

Geng discloses a facial recognition similar to that of Yan wherein multiple synthesized faces are produced from one or two originally captured facial images. In particular, Geng, like Yan, teaches that the illumination of the synthesized faces can be varied in order to account for potential variations in lighting for recognition purposes. Figure 6 illustrates the concept of generating multiple face images under various lighting conditions using predefined lighting masks  $m_i$  (column 6/26-35).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Yan and Tian by Geng to achieve the claimed invention by applying lighting mask(s) to the actual face image as projected onto a 3-D face model since Yan teaches synthetically varying the illumination of the face image to generate synthesizes facial images having different

illuminations, and Geng shows that a conventional way of achieving such a result is via the use of lighting masks to vary the pixel colors (column 6/5-35).

Regarding claims 13 and 29, Geng does not appear to expressly disclose that three to 16 predefined lighting masks are used. However, such a limitation is not considered to patentably distinguish from the combination of Yan, Tian, and Geng since it appears to represent merely an arbitrary facet of the invention. Those skilled in the art would have been aware of the relative pros and cons of utilizing any specific number of different lighting masks in order to generate a desired number of different faces under differing illuminations and would have taken those factors into consideration as design choices dependant upon the particulars of the operating environment.

Regarding claims 16 and 32, Geng discloses said at least one lighting mask includes photometric transform (column 6/26-34: the pixel values are changed by mask  $m_i$ ).

Regarding claims 19 and 35, Geng discloses said photometric transform includes at least one of: algorithmic function, exponential stretch, vertical shadow, horizontal shadow and differentiating image (column 6/26-34: algorithmic function  $m_i$ ).

4. Claims 18 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,975,750 by Yan et al. ("Yan") in view of U.S. Patent 6,879,709 by Tian et al. ("Tian") as applied to claims 17 and 33 above, and further in view of "The Integration of Optical Flow and deformable Models with Applications to Human Face Shape and Motion Estimation" by DeCarlo et al. ("DeCarlo").

Regarding claims 18 and 34, Geng does not appear to disclose that said geometric transform is estimated using optical flow estimation. However, DeCarlo shows that utilizing optical flow estimation to deform a textured face image into various poses and orientations was conventional at the time the invention was made and would have been an obvious expedient to those skilled in the art.

***Allowable Subject Matter***

1. Claims 10 and 26 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, first paragraph and 35 U.S.C. 101, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

***CONCLUSION***

1. Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRIAN Q. LE whose telephone number is (571)272-7424. The examiner can normally be reached on 8:30 A.M - 5:30 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Samir Ahmed can be reached on 571-272-7413. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Brian Q Le/  
Primary Examiner, Art Unit 2624  
12/22/09